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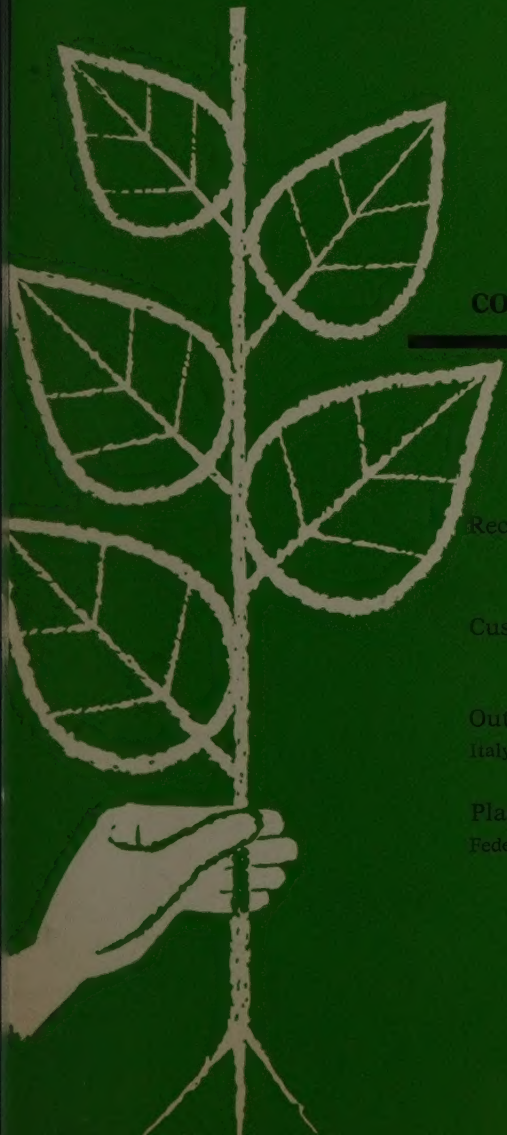

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FAO PLANT PROTECTION BULLETIN

is issued as a medium for the dissemination of information received by the World Reporting Service on Plant Diseases and Pests, established in accordance with the provisions of the International Plant Protection Convention, 1951. It publishes reports on the occurrence, outbreak and control of pests and diseases of plants and plant products of economic significance and related topics, with special reference to current information. No responsibility is assumed by FAO for opinions and viewpoints expressed in the Bulletin.

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GRASSES IN AGRICULTURE

A global review of the adaptation, management, improvement and utilization of cultivated grasses in dryland and irrigated agriculture, this authoritative volume is based on information supplied by technicians from all parts of the world and on the wide personal experience of its authors. It indicates some problems of present concern to grass specialists and describes the methods being adopted to overcome them.

The agronomy of grasses is discussed in its relation to farm planning, soil fertility, land preparation, grazing, artificial fertilizers, and the production and distribution of seed. Biology, genera and species of grasses are also reviewed in some detail, including the physiology and local adaptation of grasses, plant introduction, selection and breeding, as well as the distribution and agricultural value of certain species.

In addition to numerous references for further reading on the subject of grass agronomy, this publication includes a full glossary of bibliographical titles and an index of subject and botanical names. A table of conversion factors also appears for reader reference.

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FAO PLANT PROTECTION BULLETIN

A PUBLICATION OF THE WORLD REPORTING SERVICE ON PLANT DISEASES AND PESTS

Recent Epidemics of Stripe Rust of Wheat

by *K. Hassebrauk*, Biologische Bundesanstalt für Land- und Forstwirtschaft, Braunschweig, Germany

Until recently it was generally recognized that epidemics of wheat stripe rust (*Puccinia striiformis* = *P. glumarum*) occur in one locality only at intervals of several years and that, by comparison with other cereal rusts, stripe rust is adapted to lower temperatures and consequently attacks wheat, barley and rye, mainly during their early stages of development, with the intensity of infection diminishing gradually with rising temperatures. As a result, contrary to other cereal rusts, oversummering is a more critical problem for this rust than overwintering, and it also occurs frequently under maritime climate but never, or only sporadically, under continental climate. In spite of its irregular occurrence, stripe rust has always caused concern because its early attack can bring about lasting damage to host plants, and its infection of the ear and grain may result in underdeveloped grains.

World-wide occurrence of stripe rust

Stripe rust has been known for a long time as one of the main cereal diseases, especially in Europe, and it has at times caused considerable losses in the Near East, eastern Asia, India and North Africa. Outside these areas it has received little attention, though its occurrence has been recorded. In Kenya (4), stripe rust was first observed during 1905-06, and in 1907 it had already become epidemic. In Canada, the disease has not yet attained great importance, although Fraser and Conner (8) found it on barley in 1924 in limited areas, and Sanford (22) observed it on wheat in 1926. It has been known to occur in the United States for a long time on wild grasses but apparently it was first reported on wheat only in 1915 in Arizona (14). Until recently, its distribution remained limited to some Pacific Mountain States, outside the wheat belt. Although outbreaks occurred repeatedly in Mexico, the disease was not found in Texas. The emergence of stripe rust in South America was totally unexpected, as before 1919 its appearance was unknown there even on wild grasses. After it was first reported in 1919 in Chile, an outbreak occurred in 1929 in Argentina on wheat (13) and again in 1930 on barley (12). Later, the disease was also reported from Uruguay, Ecuador, Bolivia and Colombia (2, 3) and is now one of the most dreaded cereal diseases (1, 18) in some areas, such as the mountain valley of Colombia. In 1944 it was reported even from Guatemala (16) in Central America.

Although the spread of stripe rust mentioned above increased its range of distribution, it did not bring about any significant characteristics such as recorded recently. Occasional outbreaks in established areas, which usually diminished after some time, could be explained by the appearance of climatic conditions favorable for its survival and spread, or by the extended cultivation of susceptible varieties. For instance, the introduction in 1935 of the French winter wheat variety Joncquois into the Netherlands led to such heavy outbreaks of stripe rust that this variety had to be replaced in 1940 (27).

Recent unusual epidemics

During recent years unusual incidence of stripe rust has been reported from areas with various climatic conditions. Its severity, its continuous development during the advanced stages of host plants, and its spectacular spread into areas previously free, have become very common and rather deviate from its established pattern. It therefore seems appropriate to give more attention to the problems involved.

In England, 1952 was a year of extremely severe stripe rust, due to the prevalence of a particularly virulant biotype of race 2 (17). In the Netherlands, a serious outbreak of stripe rust in 1955, with disastrous results, was attributed to the high susceptibility of the predominantly grown wheat variety Heine VII to physiologic race 7 of the rust. Similarly, the two wheat varieties, Alba and Leda, previously considered resistant, suffered heavy losses since 1957, due probably to the occurrence of a new rust race (19). Although the variety Heine VII is now no longer commonly grown, race 7 remains the prevailing rust race in Western Europe and it occurs, together with other races, with unusual regularity in areas of Central Europe with continental type climate.

In Switzerland, where stripe rust had been very rare, it became widespread in 1954 and attained alarming proportions in 1955. As race 7 has not been identified in Switzerland, Kobel (15) attributed the increase of stripe rust to weather condition and the extensive growing of the highly susceptible Probus wheat.

During recent years the population of race 53 has increased steadily over vast areas of Western Europe. This race, first described around 1940 (9), is characterized by its late appearance and infectibility of the ear (glume and beard), and also by its virulence on wheat variety Chinese 166.

It seems that race 53 was also responsible for the recent unusual and intensive outbreaks of stripe rust in Egypt. Although this rust has always been a serious disease in the mountainous valleys of the Near East (Anatolia, Iran and Afghanistan) (6), it was less important than leaf rust or stem rust in Egypt (21) because of the difficulty of oversummering. Previously, stripe rust attacked mainly durum wheat in Upper Egypt and the southwestern part of the Delta, but during 1958 the rust was found on common wheat varieties near Cairo and Alexandria, though not in Upper Egypt. The writer found unusually heavy infection at the end of March 1958, several weeks after the appearance of other cereal rust species, in the experimental field at Cairo-Giza, on Stewart summer wheat and some crossbreeding progenies of Baladi wheat. Such infection was observed after temperature had reached 42°C. for several days. According to preliminary inoculation tests carried out in Braunschweig with rust samples collected from Giza, race 53 was involved. The same race is thought to be responsible also for the severe rust outbreak in Afghanistan in 1958.

In eastern Asia, heavy stripe rust outbreaks occurred in 1950 and 1954. Uredia were for the first time observed even late during the season (24). It is not known which races were involved but at least in China the prevalent races appeared to be characterized by their virulence on wheat variety Chinese 166 (7). According to Dr. I. Tanaka,[1] stripe rust now occurs in Japan with remarkable regularity, contrary to all earlier observations.

Reports from America with regard to stripe rust are of great interest. In 1954 and 1955 stripe rust outbreaks in Guatemala, especially in the Quezaltenango valley, where variety Supremo 211 predominates, were so heavy that about 40 percent crop loss was caused (16). In 1957 the first epidemic of stripe rust occurred in the Great Plains of the United States. In Texas, light infections had been observed in 1941, 1953 and 1956, but the 1957 outbreaks were so severe that by mid-June wheat plants had lost leaves (10). In Kansas, where stripe rust was not previously reported, it attacked only upper leaves and was suppressed by mid-June by a severe outbreak of leaf rust (20). In that year stripe rust was also reported for the first time from Oklahoma (26), Nebraska (5), South Dakota (11) and Wyoming (25). The American authors

[1] Personal communication.

cited believe that this unexpected spread of stripe rust originated from a late and severe outbreak in Mexico, coinciding with extraordinary weather conditions for wheat.

It is recognized that during recent years climatic conditions in many parts of the world were unusual, being characterized by cool and rainy summers favorable for the development of stripe rust. A study of meteorological data over many years, however, show that similar conditions occurred previously, without inducing intensive world-wide epidemics of stripe rust. The development of virulent races through the increased growing of susceptible varieties was also a common experience, but the outbreaks thus induced usually receded after such varieties were replaced. The recent epidemiological characteristics of this rust, including its increased severity and regular appearance of outbreaks in established areas, its prolonged infection often under unusual climatic conditions, and its rapid spread into areas previously free, are so different from the previously recognized pattern, that it cannot be explained satisfactorily by the change of climatic conditions and the susceptibility of host varieties. Naturally, it leads to the question if new rust races with new ecological adaptability may have developed. Nevertheless, it will be difficult to obtain early experimental proof that new races are involved, for work with stripe rust is time-consuming and race identification is uncertain and less reliable than for leaf rust or stem rust. The extensive work of Straib (23) has shown, however, that physiologic races of stripe rust may have very different physiological properties, and that biotypes originating from progressive mutation may be separated if temperature and humidity conditions are well adapted to their ecological requirements.

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Cushion Gall of Cacao in Ceylon

by *R. G. Orellana*,[1] Agricultural Research Service, United States Department of Agriculture, Gainesville, Florida

During a disease survey of the cacao-producing areas in Ceylon, the disease known as cushion gall was found to occur at a large estate in the district of Kandy, the most important cacao-growing center of the island. The disease was first observed on very few eight-year-old trees of the Trinitario complex type, located within an area approximately 100 meters in diameter. Further search for this disease revealed that there were apparently no other foci of cushion gall in the country. Some Tamil laborers of the estate said that they had seen a similar disease on cacao trees in peasant holdings in southern India, where it is known as *kalana* in the Tamil language. As far as could be ascertained, cushion gall had not been reported to occur outside the Western Hemisphere.

Cushion gall renders the tree unproductive. Fortunately, the disease is at present serious only in a relatively small area of Rivas in southwestern Nicaragua. During the last two years, however, at the cacao farm of the Inter-American Institute of Agricultural Sciences at Limón, Costa Rica, an outbreak of cushion gall, which affected only a small number of 40-year-old trees, was reported to have spread to younger trees. More recently, a survey of cushion gall made by Hutchins[2] in Central America, parts of South America, and some Caribbean islands, confirmed that the disease has been gradually spreading and that it may become a threat to cacao production. The potential danger of this disease is being recognized, and its importance is emphasized by the fact that the distribution area of cushion gall is larger than formerly realized, as shown by its presence in Ceylon.

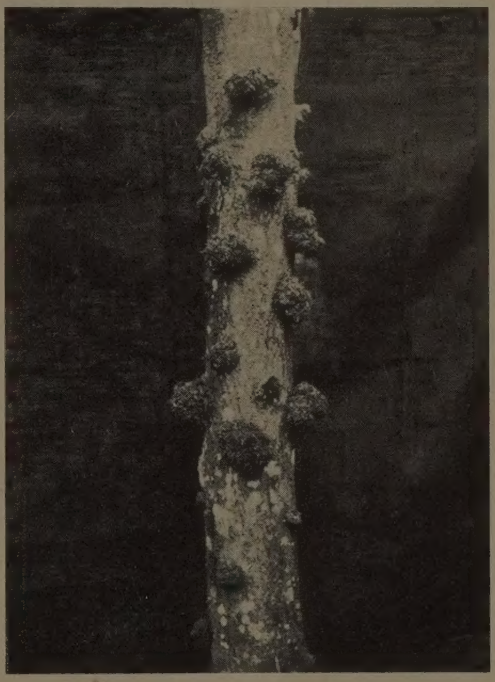

Figure 1. Cushion gall of cacao trees in Pallekelly (Kandy), Ceylon.

Cushion gall of cacao has been recorded under the following names: " verruga or agalla del cojín floral " in Colombia; cushion gall in Costa Rica, Nicaragua and Panama; " buba " in Nicaragua; and yaws in Surinam. This disease may have been observed as early as 1911, when an abnormality of the trees described as " male " cacao was reported in Trinidad, and later in 1923 in the Lesser Antilles as trunk excrescences.

[1] The writer served as an FAO plant pathologist in Ceylon under the FAO Expanded Technical Assistance Program, from July 1956 to June 1957.

[2] HUTCHINS, L. M. 1958. Current surveys for cushion gall. *Proc. Seventh Interamer. Cacao Conf.* Palmira, Colombia.

A description of cushion gall and the anatomy of the affected tissues was made by Wellman and Orellana.[3] The symptoms of this disease in Ceylon (Figure 1) are in most respects similar to those observed in Central America. In Ceylon, however, the galls were localized along the main portion of the trunk below the jorquette, whereas the branches were not affected as in Nicaragua and other areas of the Western Hemisphere.

The nature of this disease remains unknown. Hutchins[2] supports the view of earlier observers that the disease is probably systemic and induced by more than one biologic agent. Losada[4] states that insects of the genus *Eriophyes* are probably the cause of cushion gall of cacao and of a similar hyperplasia of mango. Although most kinds of causal agents of plant diseases have been suggested in connection with this disorder, the possibility that cushion gall is caused by a virus deserves special consideration.

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Outbreaks and New Records

ITALY

by *R. Ciferri*, Italian Cryptogamic Laboratory, University of Pavia

Cephalosporium *stripe disease on meadow foxtail*

Cephalosporium stripe disease was first observed on wheat in Japan in 1932 and was found to be caused by *Cephalosporium gramineum* Wisikado & Ikata. Later it was recorded on several grasses. In 1955, Bruehl[1] discovered this disease in the United States on winter wheat, rye and various grasses. Through artificial inoculation, he found that other grasses are also susceptible.

In Italy, the disease was discovered casually in April 1957 during a survey of grass diseases in a mixed artificial pasture near Pavia, with meadow foxtail (*Alopecurus pratensis*) as the dominant species. In affected plants of meadow foxtail, the vascular bundles became brown and xylem vessels were transversed by thin mycelium. Subsequent observations found that in some cases longitudinal yellow striping or diffuse discoloration of leaves was caused by this disease; such symptoms had previously been attributed to a late spring frost that occurred during the same month. From affected plants of meadow foxtail, a species of *Cephalosporium*, apparently identical with *C. gramineum*, was isolated. Further searches in the same area from April to June 1957 and again during the same period in 1958 failed to reveal the disease on oats, winter wheat or any grass, other than meadow foxtail.

Through the courtesy of Dr. Bruehl, a few North American strains were obtained for comparison with the Italian strain. It was found that all the strains had morphological and cultural characteristics, as well as cardinal temperatures similar to those of *Cephalosporium gramineum*. Based on studies by the writer and his associates[2] on the variability of saprophytic and human strains of *Cephalosporium acremonium* Corda, the writer is of the opinion that *Cephalosporium gramineum* is merely a specialized strain of *C. acremonium*, which is extremely variable in morphology, cultural characteristics and parasitism.

[1] BRUEHL, G. W. 1957. *Cephalosporium* stripe disease of wheat. *Phytopathology* 47 : 641-649.

[2] CIFERRI, R., P. REDAELLI and A. GIORDANO, 1957. Revisione di alcuni *Cephalosporium* isolati da casi patologici umani. *Mycopath. et Myc. Appl.* 8 (3) : 169-182.

It is probable that *Cephalosporium* stripe is an old disease in Italian grasslands, but it was not recognized until recently because its symptoms were mistaken for disorders caused by unfavorable nutritional or environmental conditions.

This is the third record of *Cephalosporium* stripe disease, and apparently the first one from Europe, previous records being from Japan and the United States. The host range and characteristics of this disease are being studied, and its economic importance in grasslands will be investigated.

KASHMIR

by *T. N. Kaul*, Agriculture Research Laboratories, Lalmindi, Srinagar

Bacterial blight of rice

During August 1958 an outbreak of an unknown rice disease was reported from Jammu Province. A survey revealed that the disease was widespread in all rice-growing areas of the province, causing heavy losses.

First symptoms appeared on young transplanted plants, leaves becoming withered from the tip downward and later turning straw-colored. During the advanced stage of the disease, the affected field appeared burned. Most diseased plants failed to form ears or produced only malformed grains.

Diseased plants were examined in the laboratory and found to be infected by a species of bacteria. Specimens sent to plant pathologists in Bombay, India, were determined as bacterial blight caused by *Xanthomonas oryzae* (Uyeda & Yshi) Dows.

Bacterial blight of rice was discovered for the first time in India in 1951 in the State of Bombay. Later it was reported from Calcutta. Although it had not been reported previously from Kashmir, the disease has evidently become established and is spreading in this region.

Stripe rust of wheat in Ladakh district

During September 1958 the writer carried out what was probably the first plant disease survey in Ladakh district. The area visited is unusual for its climate and topography. Maximum annual rainfall is only 5.08 inches and normal annual rainfall as low as 3.18 inches. While highest summer temperature reaches 83° F., winter temperatures may go down to −2° F. Most localities of the district are located about 10,000 feet above sea level. Wheat and barley are sown during mid-April and harvested in September. During the survey it was found that the incidence of stripe rust (*Puccinia glumarum*) was rather high on wheat and barley and a collection was made. Stripe rust had not previously been observed in Ladakh district.

Plant Quarantine Announcements

FEDERATION OF RHODESIA AND NYASALAND

The Plant Pests and Diseases (Importation) Regulations 1958, published in the *Supplement to the Federal Government Gazette* of 26 December 1958, consolidate the territorial regulations controlling the importation of growing media, plants, injurious organisms and invertebrates, and modify them to comply with the requirements of the Phytosanitary Convention for Africa South of the Sahara.

In these regulations, " vegetative material " is defined as any growing plant or any part of a plant, other than the seed or fruit, which can

be used for propagation; " supervised importation " as importation by or under the direct supervision of the Ministry of Agriculture; and " non-Convention countries " as territories of governments which are not parties to the Phytosanitary Convention for Africa South of the Sahara.

These regulations are not applicable to any growing medium, invertebrate or plant in transit which is consigned by rail or an approved airline.

Ports of entry

Southern Rhodesia: Beit Bridge, Bulawayo, Gwelo, Nyampanda, Plumtree, Salisbury, Umtali, Vila Salazar

Northern Rhodesia: Abercorn, Broken Hill, Kasumbelesa, Kitwe, Livingstone, Lusaka, Nakonde, Ndola

Nyasaland: Blantyre/Limbe, Chileka, Luchenza, Mwanza, Port Herald, Salima

Plants and growing media subject to quarantine must be introduced through Salisbury.

Import permit

The importation of any growing medium, injurious organism, invertebrate or plant is prohibited, unless a permit has been issued by the Secretary to the Ministry of Agriculture. The following plant materials, however, do not require such permits for their importation.

1. Cut flowers not for propagation.
2. Fruit and vegetable for consumption, except potatoes from countries other than the Union of South Africa.
3. Seeds, except those specifically prohibited or restricted.
4. Herbaceous ornamental plants produced in the Union of South Africa.
5. Coniferous and other timber.
6. Dormant underground parts of ornamental plants, such as bulbs, corms, rhizomes and tubers.
7. Potato tubers for propagation produced in the Union of South Africa.
8. Any plant produced in a registered nursery in the Union of South Africa, except those specifically prohibited or restricted. (Conditions governing the importation of plants specifically restricted from the Union of South Africa are not included in this abstract.)

Seed imports requiring permit

1. Seeds of the following plants from any place: banana, clover, cocoa, grapevine, groundnut (*Arachis* spp.), lucerne, rubber (*Hevea brasiliensis*), tea and tobacco.
2. Seeds of the following plants from non-Convention countries: acacia, coffee, elm, *Eucalyptus* spp., maize, peach (seed and stones, including nectarine), pyrethrum, sisal (*Agave*, *Furcraea* spp.), soybean and sugar cane.
3. Seeds of the following plants from countries other than the Union of South Africa: cereals (seed of barley, oats, rice, rye and wheat), citrus, cotton, mango, oil palms, pea (*Pisum sativum*), pepper (*Piper nigrum*), sunflower (*Helianthus* spp., including Jerusalem artichoke), tomato, tung (*Aleurites* spp.), and grass seed for propagation. Citrus seed may be imported from Portuguese East Africa.
4. Chestnuts and acorns from countries other than the Union of South Africa.

Imports prohibited

1. Any plant packed in soil, unless produced by a registered nursery in the Union of South Africa.
2. Fresh fruits from Asia and the Pacific Islands.
3. *Acacia* vegetative material from non-Convention countries.
4. Severed banana leaves and banana fruits from non-Convention countries, and vegetative material of banana from Natal.
5. *Capsicum* spp. vegetative material from non-Convention countries.
6. Cereals vegetative material from non-Convention countries.
7. Chestnut and all other species of *Castanea* plants from North America or any other country where chestnut canker (*Endothia parasitica*) is known to exist.

8. Citrus fruits and fresh and dried citrus peel (except candied peel) from territories other than the Cape Province, Portuguese East Africa and the British East African territories.
9. Clover (*Trifolium* spp.) vegetative material from non-Convention countries.
10. Cocoa (*Theobroma cacao*) fruits from non-Convention countries.
11. Coconut plants from non-Convention countries.
12. Coffee fruits (cherries) from non-Convention countries.
13. Conifers vegetative material from non-Convention countries.
14. Cotton vegetative material from non-Convention countries.
15. Dahlia vegetative material from the Union of South Africa.
16. Elm and all other species of *Ulmus* and *Zelkova* plants from Europe or any country where Dutch elm disease (*Ceratostomella ulmi*) is known to exist.
17. *Eucalyptus* spp. vegetative material from non-Convention countries.
18. Grapevine and all other species of Vitaceae plants from China, Japan, Korea or Manchuria.
19. *Hibiscus* and all other species of Malvaceae vegetative material from North and Central America.
20. Lucerne hay, meal and vegetative material from non-Convention countries.
21. Maize vegetative material and straw for packing from non-Convention countries and seed from Asia.
22. Oak (*Quercus* spp.) vegetative material from non-Convention countries.
23. *Opuntia* spp. (including spineless cactus) vegetative material and fruit for propagation.
24. Pea (*Pisum*, *Dolichos*, *Lathyrus* and *Vicia* spp.) vegetative material from non-Convention countries.
25. Peach (including nectarine) stones and seed from non-Convention countries.
26. Plane (*Platanus* spp.) vegetative material from non-Convention countries.
27. Potato vegetative material (except tubers) from non-Convention countries.
28. Rice vegetative material from non-Convention countries.
29. Rose and all other species of Rosaceae plants from Asia or the Pacific Islands.
30. Rubber (*Hevea* spp.) plants from South and Central America.
31. Soybean vegetative material from non-Convention countries.
32. Sunflower (*Helianthus* spp. including Jerusalem artichoke) vegetative material from non-Convention countries.
33. Tea plants from non-Convention countries.
34. Tobacco vegetative material from non-Convention countries.
35. Tomato vegetative material and fruit from non-Convention countries or the Union of South Africa.

Imports restricted

The following plant materials may be imported only under the condition specified. These provisions do not apply to plants imported from the Union of South Africa, unless specifically stated.

The phytosanitary certificate to accompany a consignment should be in a prescribed form, which is similar to the form annexed to the International Plant Protection Convention.

1. Vegetative material of host plants of San José scale (*Quadraspidiotus perniciosus*), including all woody perennials of Rosaceae and all species of the genera *Acacia*, *Acer*, *Euonymus*, *Fagus*, *Juglans*, *Ligustrum*, *Maclura*, *Populus*, *Ptelea*, *Ribes*, *Salix*, *Symphoricarpus*, *Syringa*, *Tilia*, *Ulmus*, from any country where San José scale is known to exist: examination and, if necessary, fumigation.
2. Avocado (*Persea* spp.) vegetative material from non-Convention countries: supervised importation and submission of phytosanitary certificate with additional declaration that the plants have been inspected during active growth and found free from pests and diseases.
3. Banana and plantain (*Musa* spp.) vegetative material from non-Convention countries: quarantine and certificate with declaration

that Panama disease (*Fusarium oxysporum* f. *cubense*) and Cercospora leaf spot (*Mycosphaerella musicola*) do not occur in the district of origin. No more than 12 plants may be imported in one consignment.

4. Broom corn (unmanufactured) derived from sorghum containing only detached straws and no part of the crown.
5. Cassava (*Manihot* spp.) vegetative material from non-Convention countries: quarantine and certificate with declaration that the plants have been inspected during active growth and found free from pests and diseases.
6. Cereals (seed of barley, oats, rye and wheat) from non-Convention countries: certificate with declaration that the seed has been inspected and found free from ergot (*Claviceps purpurea*) and treated against *Helminthosporium* spp. in an approved manner.
7. Cereals vegetative material of species not specified elsewhere: supervised importation and certificate with declaration that the plants have been inspected during active growth and found free from pests and diseases.
8. Chestnut seed and vegetative material: certificate with declaration that chestnut canker does not occur in the country of origin.
9. Chrysanthemum vegetative material: certificate with declaration that the plants have been inspected during active growth and found free from chrysanthemum midge (*Diarthronomyia chrysanthemi*), or that chrysanthemum midge does not occur in the country of origin.
10. Citrus plants grown in any territory other than Portuguese East Africa: quarantine and certificate with declaration that all citrus plants in the nursery of origin were inspected within three months prior to the despatch of the consignment and found free from pests and diseases, especially citrus black spot (*Guignardia citricarpa*) and that citrus canker (*Xanthomonas citri*) does not occur in the district of origin.
11. Cocoa seed and vegetative material: supervised importation and certificate with declaration that the plants have been inspected during active growth and found free from pests and diseases.
12. Coffee seed and vegetative material from non-Convention countries: supervised importation and certificate with declaration that the plants have been inspected during active growth and found free from pests and diseases.
13. Cotton, ginned: subject to fumigation with methyl bromide or other approved treatment.
14. Cotton seed and seed cotton: delinting or ginning and delinting by concentrated sulphuric acid.
15. Dahlia vegetative material: supervised importation and certificate with declaration that the plants have been inspected during active growth and found free from tomato spotted wilt virus (*Lycopersicum* virus 3 Smith) or that this virus does not occur in the country of origin.
16. Date palm vegetative material from non-Convention countries: supervised importation.
17. Elm (*Ulmus* and *Zelkova* spp.) plants from non-Convention countries: certificate with declaration that the plants have been inspected during active growth and found free from pests and diseases.
18. Fruit (fresh) of species not specified elsewhere from non-Convention countries outside Asia or the Pacific Islands: certificate with declaration that Oriental fruit fly (*Dacus dorsalis*) does not occur in the country of origin.
19. Granadilla (*Passiflora* and *Tacsonia* spp.) vegetative material: supervised importation.
20. Grape vine plants: quarantine and certificate with declaration that the plants have been inspected during active growth and found free from pests and diseases, especially Pierce's disease (*Medicago* virus 3 Smith) and bacterial blight (*Erwinia vitivora*).
21. Grasses (Gramineae, other than sugar cane) vegetative material: supervised importation and certificate with declaration that the plants have been inspected during active growth and found free from pests and diseases.
22. Groundnut vegetative material: quarantine and certificate with declaration that the

plants have been inspected during active growth and found free from pests and diseases.

23. *Hibiscus* spp. and all other species of Malvaceae (except cotton) vegetative material from non-Convention countries: certificate with declaration that the plants have been inspected during active growth and found free from pests and diseases. The material may not contain flower buds, flowers or fruits.
24. Lucerne seed: certificate with declaration that the consignment is free from dodder (*Cuscuta* spp.); and that the plants have been inspected during active growth and found free from crown wart (*Urophlyctis alfalfae*), wilt (*Corynebacterium insidiosum*) and lucerne dwarf virus (*Medicago* virus 3 Smith) or that all these diseases do not occur in the country of origin.
25. Maize seed from non-Convention countries outside Asia: each consignment limiting to 10 pounds and certificate with declaration that Stewart's disease (*Xanthomonas stewarti*) does not occur in the district of origin.
26. Mango plants from non-Convention countries: supervised importation and certificate with declaration that the plants have been inspected during active growth and found free from pests and diseases.
27. New Zealand flax (*Phormium tenax*) vegetative material: certificate with declaration that the plants have been inspected during active growth and found free from pests and diseases.
28. Oil-palm plants from non-Convention countries: supervised importation.
29. Olive (*Olea* spp.) vegetative material from non-Convention countries: supervised importation.
30. Onions, chives, garlic, leeks, shallots and other species of *Allium* vegetative material for propagation: certificate with declaration that the plants have been inspected during active growth and found free from onion smut (*Urocystis cepulae*) or that onion smut does not occur in the country of origin.
31. Pea (*Pisum sativum*) seed: certificate with declaration that the plants have been inspected during active growth and found free from bacterial blight (*Pseudomonas pisi*) or similar pathogens or that bacterial blight or similar pathogens do not occur in the country of origin.
32. Pepper plants from non-Convention countries: supervised importation.
33. Pineapple vegetative material, from non-Convention countries: supervised importation.
34. Pome fruit trees (including ornamental species of *Cydonia*, *Malus*, *Pyrus* and *Sorbus*) vegetative material from non-Convention countries: certificate with declaration that the plants have been inspected during active growth and found free from pests and diseases and that fire blight (*Erwinia amylovora*) does not occur in the district of origin.
35. Potato tubers: certificate dated less than 30 days before the despatch of the consignment with declaration that they were grown in land officially certified as being free from potato root eelworm (*Heterodera rostochiensis*) and other cyst-forming nematodes; and that wart (*Synchytrium endobioticum*) and bacterial ring rot (*Corynebacterium sepedonicum*) do not occur within 5 miles of the place of origin and no wart disease has been observed in that area during the preceding 10 years, or that wart and bacterial ring rot do not occur in the country of origin.
36. Pyrethrum plants from non-Convention countries: supervised importation.
37. Rice seeds for propagation from non-Convention countries: supervised importation.
38. Rosaceae fruit from non-Convention countries other than Asia and the Pacific Islands: certificate with declaration that Oriental fruit fly does not occur in the country of origin.
39. Rosaceae vegetative material of species not specified elsewhere: certificate with declaration that the plants have been inspected during active growth and found free from pests and diseases.
40. Rose vegetative material: certificate with declaration that during active growth of the plants they and all other rose plants on the same premises were inspected and found

all free from rose streak (*Rosa* virus 4 Smith) and rose wilt (*Rosa* virus 3 Smith), and that they were found free from other virus diseases of rose, including rose mosaic (*Rosa* virus 1 Smith), and that not less than 98 percent of the other rose plants on the same premises were found free from other virus diseases of rose, including rose mosaic.

41. Rubber (*Hevea brasiliensis*) plants: supervised importation.
42. Sisal (*Agave* and *Furcrae* spp.) plants from non-Convention countries: supervised importation.
43. Strawberry vegetative material from non-Convention countries: certificate with declaration that the plants have been inspected during active growth and found free from virus diseases and strawberry red core (*Phytophthora fragariae*).
44. Sugar cane plants: supervised importation.
45. Sunflower (*Helianthus* spp. including Jerusalem artichoke) seed: certificate with declaration that the plants have been inspected during active growth and found free from pests and diseases and that virus diseases of *Helianthus* spp. do not occur in the country of origin.
46. Sweet potato vegetative material from non-Convention countries: supervised importation and certificate with declaration that the plants have been inspected during active growth and found free from pests and diseases and that internal cork virus disease does not occur in the district of origin.
47. Tobacco seed: certificate with declaration that the plants have been inspected during active growth and found free from pests and diseases, especially anthracnose (*Colletotrichum tabacum*) and that blue mould (*Peronospora tabacina*) does not occur in the district of origin.
48. Tomato plants: certificate with declaration that the plants have been inspected during active growth and found free from bacterial canker (*Corynebacterium michiganense*) or that bacterial canker does not occur in the country of origin.
49. Tung plants: certificate with declaration that the plants have been inspected during active growth and found free from pests and diseases.
50. Yam (*Dioscorea* spp.) vegetative material from non-Convention countries: certificate with declaration that the plants have been inspected during active growth and found free from pests and diseases.
51. Ornamental plants vegetative material (excluding dormant underground parts) of species not specified from non-Convention countries: certificate with declaration that the plants have been inspected during active growth and found free from pests and diseases.
52. Bulbs, corms, rhizomes, tubers and other dormant underground parts of ornamental plants: washed free from soil, and certificate with declaration that the plants have been inspected during active growth.

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An invertebrate, whose importation is not governed by another law, may not be imported, unless a permit authorizing its importation has been issued. An injurious organism may not be imported, unless the importation is for scientific purposes and under the direct supervision of the Ministry of Agriculture, and provided an import permit has been issued.

ROMA, 1959 — Tipografia del Senato del Dott. G. Bardi.

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